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ABSTRACT

The progress of undergraduate education in cancer in European countries was assessed, and recommendations were offered for further development according to the EURO program. Based on a survey of undergraduate education in medical schools of the European region, the following areas were evaluated: goals and objectives of teaching, tasks a general practitioner will be faced with in the field of oncology, the need for coordination of teaching, the importance of an interdisciplinary approach to teaching, distribution of teaching tasks among members of the faculty, methods of oncological teaching applicable to medical students, criteria of success, the organization of oncological training, and evaluation of examinations and teaching. Ways to improve undergraduate training in oncology are considered in relation to: program organization, elective courses, student attitudes and career aspirations, the use of cancer institutes and the role of voluntary and professional leagues and societies, and the role of the World Health Organization. Recommendations include the following: (1) the program should provide graduates with sufficient practical knowledge of tumor biology and pathology, epidemiology, prevention, early diagnosis, methods of treatment, and followup and rehabilitation to prepare them for future medical practice, especially at the primary health care level; (2) medical schools should review their educational objectives on the basis of task analysis of primary health care physicians; (3) cancer institutes and universities should cooperate in the cancer education of undergraduates; and (4) a specifically designated part of the curriculum should be devoted to oncology, but may be of variable length. (SW)

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Undergraduate Education in Cancer in the European Region

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Report on a UICC/WHO Meeting

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The UICC/WHO Meeting on Undergraduate Education in Cancer was held in Geneva from 6 to 8 April 1981. It was organized in collaboration with the Swiss Government, the European Organization for Research and Treatment of Cancer and the Ligue genevoise contre le Cancer.

The Meeting was opened by Dr M. Postiglione, Director, Disease Prevention and Control, WHO Regional Office for Europe, on behalf of the Regional Director and Mr A. Werner, Conseiller d'Etat, Chef du Département de la Prévoyance sociale et de la Santé publique, on behalf of the Swiss Government. The participants were welcomed by Professor A. Cruchaud, Dean of the Faculty of Medicine, University of Geneva, Dr P. Ducommun, President of the Ligue genevoise contre le Cancer, Dr P. Alberto, Swiss Society of Oncology and Swiss Cancer League, Dr H. Tagnon, past President of the European Organization for Research and Treatment of Cancer, and Dr U. Veronesi, President of the International Union against Cancer (UICC).

Dr C.D. Sherman was appointed Chairman, Dr J.F. d'Ivernois Vice-Chairman, and Professor W.K. Jasinski Rapporteur.

INTRODUCTION

The development of cancer control services in the European Region cannot be dissociated from training in oncology, both undergraduate and postgraduate. The problem of such training was reviewed initially by a UICC Regional Conference on Undergraduate Education in Oncology held in Cracow in 1972,[a] which drew up general recommendations on the subject, and subsequently by a WHO Working Group on Postgraduate Training in Clinical Oncology held in The Hague from 6 to 8 December 1978.[b]

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[a] *UICC Bulletin*, 10(4). December 1972.

[b] *Postgraduate training in clinical oncology:* report on a WHO Working Group. Copenhagen, WHO Regional Office for Europe, 1979 (unpublished document ICP/CAN 011).

The countries of the Region have developed their cancer control services in different ways according to their socioeconomic conditions and the availability of staff, and this in turn has influenced the system and content of undergraduate training in this field. Some countries have started formal undergraduate programmes in oncology, while others still make arrangements for such training within established disciplines like gynaecology, surgery, internal diseases, and paediatrics. However, there is growing recognition that undergraduate training in most countries has concentrated on technical, highly specialized issues while paying inadequate attention to such aspects as prevention, screening, primary health and psychosocial (in particular palliative) care for cancer patients, and cooperation between or integration of specialized cancer services and primary health care.

The very large resources expended in the Region on cancer control appear to produce only limited gains, either because available knowledge is not being utilized or because more knowledge is needed, or for both reasons.[a] The place of undergraduate and of postgraduate teaching in oncology is not clearly defined in most training programmes. Countries have noted the need for guidelines on the integration of cancer control with other fields such as education.[b] National policies on cancer training need to be carefully examined and clearly defined.[c] This situation is the same for all aspects of cancer control, in particular training programmes, which should promote community-health-oriented undergraduate education, stressing prevention, the assessment of risks, and a systematic approach to cancer.

The purpose of the Meeting was to analyse various training models, to assess the progress of undergraduate education in cancer in countries of the Region, and to make recommendations for further development according to the EURO programme.

A questionnaire had been designed by UICC and WHO to gather information on selected features of undergraduate teaching of oncology and had been sent to the medical schools in the Region before the Meeting. The replies served as a starting point for the discussion, which focused on the following topics:

– the role of cancer institutes and voluntary cancer leagues and societies in undergraduate education in the cancer field;

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[a] *Comprehensive cancer control:* report on a conference. Copenhagen, WHO Regional Office for Europe, 1978 (unpublished document ICP/CAN 004).

[b] *Formulation of a cancer control programme in the European Region* (unpublished WHO document EUR/RC28/7).

[c] *The role of the Regional Office in the field of cancer* (unpublished WHO document EUR/RC27/9).

- the point of view of the medical student, the practising physician not a specialist in cancer (especially the general practitioner), and the clinical cancer specialist on undergraduate education in the cancer field;
- innovations in medical education theory, technology, and methodology; the design of the cancer curriculum; programme organization and evaluation;
- UICC policy and achievements and the potential role of the WHO Regional Office for Europe in undergraduate cancer education.

SURVEY OF UNDERGRADUATE EDUCATION IN THE MEDICAL SCHOOLS OF THE EUROPEAN REGION

In all countries of the Region the teaching of oncology forms part of more or less conventionally structured courses covering such subjects as pathology, medicine, surgery, otorhinolaryngology, and radiology. The degree of freedom the schools have in setting their syllabuses and curricula differs considerably. At one end of the spectrum are countries whose medical schools are expected to produce graduates properly prepared for future vocational training; in them ways of achieving this aim are left to the discretion of a professorial body as long as the basic demand is met. At the other end are countries where detailed syllabuses are formulated by an institution or organization of specialists and approved by authorities responsible for undergraduate medical education. The instructions given by these bodies may even list the departments responsible for a particular part of oncological teaching and training and indicate how many hours should be devoted to the oral presentation of a particular cancer subject and to seminars, bedside instruction, practical work, etc.

In some countries the education process is coordinated by a single faculty member, e.g., by a professor in oncology. In other countries a chair of oncology or radiotherapy is entrusted with the task of coordinating oncological teaching conducted by different specialists. There are also countries where the teaching of oncology is not coordinated at all.

There is a clear trend towards an interdisciplinary presentation of oncological problems, and in many schools ways of improving the coordination of oncological teaching and making it more efficient are under consideration by the medical faculties, by the authorities responsible for education, or by both.

Specialized cancer institutions such as faculties and departments (academic or professional), functional centres, hospitals, or institutes operate in all countries, but their involvement in undergraduate teaching varies

according to local conditions. Almost all are responsible for at least some instruction and practical training.

Separate courses in oncology, organized as a rule for senior students, are compulsory in the schools of all countries with one exception, and are usually the responsibility of specialized cancer institutions, i.e., centres or institutes of oncology that are engaged in all types of oncological activity. The courses provided have different structures. In some cases they are devoted mostly to general cancer problems such as epidemiology, the local system of specialized health care delivery, records and follow-up, and terminal care; in others the maximum use is made of the clinical experience of an oncological institute for the benefit of the undergraduates. As a rule, at least 10–14 days are devoted to this type of teaching, and students are often taught on a full-time basis for a whole fortnight.

In some cases even more unconventional educational facilities are open to individuals specially interested in clinical or research problems connected with cancer. Part-time or full-time attachment to the institute is possible for different periods, usually for no longer than several weeks. In other cases small circles of students devote their free time for comparatively lengthy periods to clinical or laboratory activities directed by members of the teaching staff of a cancer institute or department of oncology.

There are chairs of oncology or radiotherapy in all but one of the countries in the Region. In one country all medical schools are required to have a chair of oncology, which is entrusted with important cancer education tasks.

Multidisciplinary conferences discussing the diagnosis and the best treatment for each patient (or for selected patients) are a daily routine in all institutions and units specializing in oncology. This is not the case in places that have no oncological facilities. Usually these conferences are not compulsory for students, but they may attend them if they wish.

The recognized medical specialties are as follows:

- radiology (including diagnosis, therapy, and nuclear medicine);
- radiotherapy (in the country concerned there is no tendency to recognize oncology);
- radiotherapy; medical oncology (i.e., chemotherapy of cancer);
- oncology (including radiotherapy, chemotherapy, and cancer surgery);
- oncological radiotherapy; oncological surgery; oncological gynaecology; oncological histopathology;
- general oncology; gynaecological oncology.

Audiovisual teaching aids such as slides, tape-recorded texts, video cassettes, teaching machines, and computerized multiple-choice question tests

are rarely available for individual learning, and programmed manuals of oncology do not exist. In only one country must oncological subjects be included in the final examinations in medicine, surgery, and gynaecology. In the other countries they are not compulsory, but the faculties are often encouraged to supply the multiple-choice question bank with questions concerning cancer, which may be included in some tests.

The physicians and faculties in all the countries of the Region are greatly concerned to improve oncological teaching and make it more effective. The establishment of clinical departments of oncology at medical schools is considered as most desirable, because oncological teaching can be effective only if an adequate number of cancer patients is available and their medical records are fully accessible to teachers. Many faculties are of the opinion that it is necessary to define the knowledge, skills, and approach that should be inculcated in graduates by their schools with regard to cancer. The time allotted to cancer teaching, they feel, should be increased and the additional time be devoted to practical training in clinical oncology. As, however, the time already spent on medical training cannot be prolonged, oncological training can be expanded only within the framework of education in problems of universal priority for the health of the population, e.g., prevention, primary care, and occupational medicine. Cooperation among different specialists in oncological teaching is also needed.

It is generally accepted that oncological education should depend on:

- the problems posed by various types of cancer, their different localizations, and the involvement of various organs and systems of the body (the epidemiological basis);
- the capacity of the oncological services; and
- cost-benefit considerations.

In other words, medical education in oncology should reflect the health situation of the population and the state of the health care delivery system in the country.

The quality of oncological teaching needs to be improved, since family physicians and general practitioners play a crucial role in the early detection and successful treatment of cancer. To improve the education of medical graduates it is important to coordinate teaching among the disciplines involved and define the minimum knowledge and skills the graduate must have in the field of cancer.

The recognition of oncology as a medical specialty would be an important step in raising the level of education, since it would lead to the involvement of oncological units and oncologists in the teaching of medical students. The existence of multidisciplinary cancer centres within medical schools, structurally and physically affiliated to the schools, would be of great help in achieving that objective.

Dissatisfaction with the present system of university education is worldwide and has been voiced by both teachers and students. There are many reasons for it, one being the changing place of education in the contemporary world and, especially, the demand for universal education. That is why attention should be focused first and foremost on how to adapt medical training (including training in oncology) to contemporary needs. However, since the term "contemporary needs" means different things in oncology, even in countries situated in the same region of the world, any discussion on how to adapt education to these needs can only be general in nature.

The aim of medical education is to produce graduates properly qualified to work at the primary health care delivery level, to meet the needs of the patients entrusted to them. Undergraduate medical education is the process of conveying to medical students the knowledge, skills, and attitudes they require under their local health conditions, in particular to collect and use information and plan and carry out community health programmes.

The reasons for the unsatisfactory level of oncological training are specific to this branch of medicine. Malignant tumours form a large and differentiated group of diseases that attack all the organs and systems of the body. Most of the diagnostic and therapeutic methods known can be used to benefit cancer patients, and the range is rapidly expanding. Intensive studies on the nature of malignant tumours and the practical application of new discoveries are being conducted in many fields of basic and applied research. In very few countries, however, has the teaching of clinical cancer been commensurate with the development of oncological practice, and in the world as a whole it is still mainly of a conventional character, instruction concentrating either on the various organs and systems of the body or on various diagnostic and therapeutic methods. Medicine is taught by an internist, who usually specializes in increasingly narrower fields today; a surgeon lectures on the pathophysiology of the same organs and systems as an internist but in the light of the need for surgical intervention; lectures and practical training on the pathology of the same organs and systems are delivered earlier by the pathologist; and a radiologist deals with the detection of changes in these organs and systems. As a result, a medical student hears of the tumours of the same organ from several specialists, and it often happens that the same problems in theoretical or clinical oncology are presented several times in different ways, some problems not being included at all because each of the lecturers expects the subject to be presented by another specialist. Moreover, the differences in opinions held by various disciplines, however objectively justified they may be, may be sufficiently great to exert a negative effect on the process of instruction.

In most countries there is a significant gap between the actual cure rates of various cancers and the maximum cure rates obtainable through utilizing currently available knowledge. This indicates the size of the educational problem and the potential number of lives to be saved throughout the world by diffusing and utilizing the knowledge already existing. Furthermore, research

gains are adding significantly to our ability to treat and cure certain cancers and this increases the need for greater educational efforts.

OBSTACLES TO EFFECTIVE LEARNING IN ONCOLOGY

Four important obstacles to effective learning of oncology were identified at the Meeting.

The first obstacle is undoubtedly the whole spirit of medicine at present, which is almost completely at odds with the spirit needed for the approach to cancer. Medicine is still seen by those who practise it and those who receive it to be predominantly about cure or successful treatment. It is not seen to be about prevention, epidemiology, primary health care delivery, community needs, health education, the management of irreversible conditions, etc.

The second obstacle lies within the bounds of the medical school itself. The people who frame the medical school curriculum are still obsessed with the imparting of knowledge and to a lesser extent skills, and only minimally with the cultivation of attitudes. The problem, of special importance in oncology, does not lie in the acquisition of knowledge but in the application and dissemination of that knowledge.

The third obstacle is inadequate and, in some cases, erroneous knowledge. Only a few medical schools include any teaching about counselling on death and dying, and they often restrict such teaching to short periods in behavioural science or psychiatry courses. Two-thirds of the general public, for example, think that cancers are the most common causes of death, over half consider them to be the most alarming group of diseases, and a fifth believe that cancers are never curable. Surprisingly, too, members of the nursing and other caring professions prove to be as pessimistic as the general public.

The fourth obstacle is the way oncology is typically taught. Protagonists can be found both for teaching oncology as a separate course and for teaching it as a multidisciplinary subject. If experience in other specialties is anything to go by, arguments of that kind are a waste of effort, because what matters is how the subject is taught; didactic teaching will fail whatever the organizational setting, if its aim is to convey skills or attitudes.

BASIC PROBLEMS OF UNDERGRADUATE TRAINING IN ONCOLOGY

Goals and objectives of teaching

The goals of teaching can be represented in the form of specifications of the knowledge, skills, and behaviour a physician should display on completing

his studies. These goals should be closely linked with the tasks the general practitioner is expected to perform in the health care system of his country. Undergraduate teaching is meant to give students only those qualifications which are needed by all physicians upon completion of their studies. It does not include anything that exceeds the competence of a general practitioner and calls for the qualifications of a specialist; the general practitioner, who is the first to establish contact with patients, must be capable of satisfying the needs of cancer patients in the best way possible under the conditions obtaining in the health service of his country. In fact, however, the general practitioner must have relatively high qualifications in oncology, for the following reasons.

Since there is as yet no cure for advanced cancer, only treatment of a malignant tumour detected at an early stage offers a real chance of curing the patient. That is why the general practitioner, who as a rule has the first contact with a patient, must be aware that his patient may be suffering from cancer and be able quickly and competently to determine the nature of the disease. Similarly, when looking after a patient who has undergone cancer treatment, the general practitioner must be able to take action when the signs or symptoms indicate that there may be a recurrence. Observation of the reactions of general practitioners to complaints that might indicate cancer shows that more effective undergraduate training and continuing education are necessary to improve the ability of general practitioners to detect the possibility of cancer and take the appropriate action.

The following skills may be proposed as the general goals of medical training in cancer:

(*a*) A medical graduate should be able to solve the clinical problems that are characteristic of the most frequent types of cancer. In order to solve them he must be able:

- to define the problems;
- to collect and interpret the information necessary to establish the etiology, pathogenesis, diagnosis, and prognosis; and
- to plan how to tackle the problems.

(*b*) The graduate should have the ability, important to every physician, to establish contact, exchange opinions, and communicate, to speak and write on medical problems, and to communicate with other health service workers, patients, and their families.

(*c*) The graduate should understand that knowledge, and his knowledge in particular, is limited. He should therefore realize the need for continuing education.

Similarly, teaching objectives depend on the conditions in which the physician will work. Among these conditions the following are particularly important: the epidemiological situation, especially the incidence of various types of cancer and the population that is most exposed to them; the hygiene situation, especially the population's familiarity with health problems; the level of sanitary and health education and the ensuing demand for health services; the resources of the health service, especially its infrastructure and territorial distribution; and the organization of the health services.

It is useful to specify in detail the goals and objectives of teaching. First and foremost this ensures understanding between teachers and students, enabling the latter to learn on a secure basis what is required by the school. It promotes mutual understanding between the teachers in the planning of training and facilitates the choice of the proper teaching procedures. It makes it possible to determine whether the student has reached the goals set and to explain to him why he has failed, if he has. Definition of the goal of teaching and a clear indication of the importance and priority of its elements are the first steps in improving the level of training, for they tell the student what he should know, what he is expected to be able to do, and how he should act as a physician.

Scope of information

Analysis of the tasks a general practitioner will be faced with in the field of oncology, and of the goals of teaching, indicates that the scope of information that should be imparted to medical students is extremely wide. However, it is information that is necessary for every physician completing his studies, and it can be defined as the minimum the students need to carry away with them from the school. The choice of this information is one of the tasks of a coordinating committee within the medical school, and the following knowledge and skills should be included.

- Knowledge of the life processes of normal and pathological cells (metabolism, life cycle, growth characteristics), because the physician must understand how a cancerous tissue differs from the normal tissue from which it originates.
- Knowledge of the main carcinogenic factors affecting man (chemical, biological, and physical), as the physician must have a theoretical foundation for preventive work in existing and future environmental conditions as well as for the identification of risk groups and risk situations.
- Awareness of the role and possibilities of the pathologist (histopathologist, cytologist) in diagnosis and familiarity with his work and language so that the physician is able to cooperate with him.

- Ability to distinguish the persons who have or may have cancer from among those who have complaints or symptoms that arouse suspicion. This selection of patients takes place before histological confirmation of the diagnosis and is therefore of immense practical importance, requiring considerable knowledge and critical ability on the part of the physician. It is an extremely difficult skill for the general practitioner to acquire, since he must not make mistakes even though as a rule he sees only a few cancer cases.
- Ability to choose, and possibly also to carry out or recommend, simple diagnostic procedures. The general practitioner must be able to eliminate the suspicion of cancer or diagnose the disease in the simplest possible way, a skill that requires special attention on the part of teachers.
- Ability to identify the characteristics of the patient of decisive importance as indications for the treatment and prognosis. Of greatest importance in this respect are ability to assess the development of the disease, knowledge of the various stages of cancer, and ability to make use of this knowledge in practice; choice of the type of treatment (radical, palliative, or symptomatic); and knowledge of the standard methods of treatment and their results in the light of the localization and stage of the tumour and its microscopic structure.
- Ability to suspect and detect cancer at an early stage, especially in the preclinical period of its development. Although a pessimistic attitude to the treatment of cancer is harmful, the physician must adopt an objective approach to the possibility of successfully treating an advanced cancer.
- Motivation for health education: the physician must understand that only with the cooperation of the population as a whole can cancer be detected at an early stage.

In view of what has been said above, it would appear obvious that general practitioners must have oncological competence. As they are the first to come into contact with cancer patients, it is they who in fact determine what happens to them.

Coordination of teaching

The main difference between the contemporary and the traditional system of oncological teaching is that the former implies a far-reaching understanding among teaching specialists on the content and course of training. Present-day oncological training is a meticulously directed process, each member of the faculty who takes part in it knowing perfectly well the role he is to play in this collective effort. Experience has shown that the most effective method of

achieving this understanding is by a committee entrusted with the task of advising the dean and the faculty council on all aspects of the coordination of oncological training.

A coordinating committee should be set up by the dean of the medical faculty. It may consist of, for example, an internist, a surgeon, a radiotherapist, a pathologist, a gynaecologist, and a paediatrician, a total of no more than six persons. It should be headed by a specialist in one of the above-mentioned disciplines who, because of his interest and experience in oncology, enjoys prestige among the faculty members.

The committee would have the following tasks: to establish the goals and objectives of teaching; to distribute teaching tasks among the faculty members; to recommend methods of teaching; to define the criteria of success in teaching, i.e., unambiguous and objective bases that make it possible to determine whether the student has reached the planned goal; to define principles for assessing the usefulness and effectiveness of the teaching, i.e., objective tests of the knowledge, skills, and behaviour of students; and to maintain continuous coordination of the teaching.

A coordinating committee composed of representatives of important disciplines engaged in oncological training would be a much more effective solution than a single coordinator, because the teachers making up the committee would themselves establish the principles of coordination, distribute the teaching tasks, draw up timetables, and exercise control over the implementation of the tasks that have been set. In this way coordination would not be imposed by one person whose authority might be called into question. This is all the more necessary since coordination is usually unpopular at the beginning, so that the difficulty of implementing it by a single coordinator would be increased.

Multidisciplinary approach

Clinical oncology makes use of at least four methods of treating malignant tumours – radiotherapy, surgery, chemotherapy and hormonotherapy, and immunotherapy – and no single oncologist, however versatile, can be expected to have a command of all these methods and the relevant indications for treatment. Thus no one person is capable of teaching students how to make the right therapeutic decisions. The situation is further complicated by the great variety of diagnostic methods applied in oncology – radiology, histology and cytology, clinical biochemistry, nuclear medicine, radioimmunology, sonography, etc. – which also require high-level narrow specialization. This shows the importance of an interdisciplinary approach to teaching, the aim of which should be to explain the various aspects of oncological diagnosis and therapy, present the strong and weak points of the various methods, discuss how they complement each other, and give the clearest possible instructions on how to solve the classic problems of diagnosis and therapy.

Even the longest practical clinical training cannot teach a medical student how to solve all the intricate diagnostic, therapeutic, and rehabilitation problems he will be confronted with in his professional life. An interdisciplinary approach to these questions will make the student realize the necessity to consult the right specialist on every difficult problem he encounters during his work as a physician. A doctor who understands this will ensure that cancer patients receive the best possible care in any given conditions.

Distribution of teaching tasks

When the goals and objectives of teaching have been defined, the teaching tasks can be distributed among the members of the faculty. Although this may seem to be easy once it is known what the objectives of teaching are, it calls for cooperation not only on the part of the members of the coordinating committee but also on the part of other members of the faculty who are engaged in oncological training.

Full agreement on the teaching tasks is the most effective way of avoiding gaps, duplications, and contradictions in teaching. Differences in opinions are understandable in the medical profession and should not give rise to surprise or misunderstanding, since there are many clinical situations where no solution can be said to be the best, or even satisfactory (e.g., the treatment of osteogenic sarcoma). Nevertheless, medical students should be given unequivocal instructions on diagnostic and therapeutic procedures, even if this involves renunciation of their personal views by some faculty members. The student may hear that his teachers are not yet able effectively to solve some practical problems, and this will only be to his advantage; but contradictory opinions expressed for example by two different specialists on the efficacy of certain methods of treating cancer and not supported by evidence, are decidedly harmful.

Methods of teaching

In this section those methods of oncological teaching applicable to medical students are discussed whose aim is to impart the information, skills, and ways of behaving that are indispensable to every physician but especially to the general practitioner, who is the first person a patient sees to obtain advice on his health.

Medical training, including oncological training, is generally divided into preclinical and clinical years, the former concerned with basic, the latter with practical problems. Preclinical teaching consists mainly of lectures and seminars, supplemented as far as possible by audiovisual material, programmed texts, and frequent brief objective tests. An important role in preclinical teaching is played by laboratory work, provided that the choice of subject makes the work of real benefit for the students' further studies.

Medical schools should lay emphasis on the early replacement of lectures by individual learning, supplement such learning as intensively as possible by seminars for small groups of students, and frequently check the progress achieved. During the preclinical years the student should already realize that it is in his own interest to expand his knowledge independently, because during the clinical period most of his time will be spent on acquiring the necessary skills, i.e., on practical training.

During the clinical years attention should be focused on practical training. The acquisition of information that must be memorized should be left to the student. He should be able to obtain the information from specially prepared monographs containing the concise information necessary for successive practical exercises, from audiovisual material, programmed texts, and self-assessing tests linked with monographs and practical exercises.

Medical schools should attach great importance to the production of audiovisual material such as tapes, slides, and videotapes that systematically present all aspects of the preclinical and clinical problems of oncology.

During the clinical period special attention should be paid to the following.

- Training in oncological outpatient clinics, especially surgical, radiotherapeutic, chemotherapeutic, gynaecological, and paediatric. This training should stress the importance of screening procedures and early diagnosis.
- Hospital rounds directed by teachers of oncology. Like the work in outpatient departments, the rounds should acquaint the student with various specialties, routine work in wards, especially routine care of patients, diagnostic reports, and selected operations. The work in hospital wards should include the physical and mental care of terminally ill patients.
- Practical training devoted to the physical and mental rehabilitation of patients after treatment. During practical training students should be systematically acquainted with the entire process of following patients up after treatment, starting with the organizational problems and ending with the use of the results obtained to benefit the patients concerned and to improve methods of diagnosis, treatment, and prognosis. This part of the work should lead the student to realize that in his future practice he must closely follow the health of his patients after treatment.
- Clinical conferences attended by various specialists, with demonstrations of patients, interpretation of collected information, suggestions for treatment and their justification, and establishment of indications for treatment. As the students become more qualified, they should take an active part in the meetings, present the patients entrusted to their care, and propose treatment, justifying the proposals by objective data.

- The work of the cancer registries. The aim of this part of the training is to bring home to the student the necessity of full cooperation between the physician on the one hand and hospital and population cancer registries on the other.
- The reading during clinical training by the student of selected papers on which he should report during seminars. He should also contribute to original clinical studies and publications.

The teaching of clinical cancer should constitute an important activity of the oncological centre. Consequently, the education imparted must not be a byproduct of routine diagnostic and therapeutic services; a fairly limited number of carefully selected patients should be treated in the course of training.

Two practical conclusions may be drawn from the above survey of methods of training. First, if the teaching is to be effective it requires detailed planning and careful preparation. Second, teaching requires an expanded infrastructure and a team of qualified specialist teachers.

Criteria of success

It is insufficient to formulate the goals of teaching only, because such a formulation does not include criteria of success. These criteria are, however, present in the objectives of teaching, which should unambiguously convey to the student the teacher's intentions and are implied in the way the objectives of teaching are defined. For example,

- the student should know the following early symptoms of cancer: . . . ., ...
- the student should know that the incidence of cancer of the . . . . in his country is . . . . in men, and . . . . in women;
- the student should be able correctly to interpret the X-ray of . . . ., ...
- the student should be able to interview the patient, take the case history, make a report, and interpret the symptoms of a malignant tumour of . . . ., ...

Such a formulation of criteria makes it clear to both teacher and student what the teaching requirements of the school are and what is expected of them both.

Organization of oncological training

A teaching centre can provide efficient oncological training both in the quality and in the teaching to students of the required skills in a reasonable

period of time only if it examines and treats a large number of cancer patients covering the entire scope of oncology in the teaching programme who remain under the care of the teaching centre throughout. If the number of patients is large, the approach to a patient suffering from cancer is based on experience, is objectively justified, and is consequently convincing. A large number of patients also makes possible a wide choice of clinical material in accordance with the teaching programme and provides a large-scale demonstration of the stages of cancer. Such a demonstration is of special importance if the teachers wish to present the entire course of the disease during one class, which can be done only if a group of patients at various stages of the same disease type is available. Without substantial and diversified clinical material it is impossible to prepare a comprehensive amount of relevant audiovisual material for teaching purposes. Extensive clinical material is also necessary if the assessment of the results of treatment and of the influence of various methods of treatment on those results is to be reliable.

It follows from the above that, without free access to extensive oncological material, clinical teaching in this field will be of little or of limited value for the future medical practice of students.

Evaluation of the results of training

It is generally accepted that the results of examinations are a reliable measure of the quality of teaching. In reality, however, the results of the standard oral examination are only a reflection of an examiner's evaluation of the way in which the student has reacted to the questions he has been asked to answer.

The traditional medical examinations (oral examinations, written essays, medical examinations of patients involving a diagnosis and the establishment of indications for treatment) test a limited amount of the student's knowledge and skills and as a rule do not evaluate his behaviour, assessing only in part his intellectual abilities. Nor do they use objective criteria, the results of the examinations being evaluated subjectively. It can therefore be said that the results do not tell whether the student has mastered a sufficiently wide range of knowledge and skills and whether his medical behaviour satisfies the requirements of the school, or at least they tell very little about this. Neither do they indicate whether the process of teaching was fully efficient or whether the extent of the knowledge and skills he has acquired meets the needs of the health service.

A thorough evaluation of the teaching should be conducted by at least two independent groups. It should be performed by the medical schools themselves and by the national health service organization. The strong and weak points of various types of examination have long been a subject of interest and lively discussion among teachers and students. The discussion has at least clarified some important general features of the process of evaluating the

knowledge and skills acquired by students. The school should formulate its requirements precisely and the criteria it uses to ascertain whether the students meet them. The examinations should test a representative range of knowledge and of the abilities and behaviour of future physicians, but at the same time remain within the limits of the school's known and strictly defined requirements. The examinations should be carried out so as to ensure the greatest possible objectivity of evaluation. These general features apply to all kinds of examination, both academic and professional.

Evaluation by students of the teaching is of importance in view of the fact that it is the aim of a medical school to produce candidates well prepared for vocational work. The opinions expressed by students as candidates for the medical profession can help improve the teaching and make it increasingly efficient.

Medical faculties should evaluate the content of the teaching by a periodic survey of the goals and objectives of oncological teaching with a view to redefining them so as to adapt them to the progress achieved in knowledge and in the methods and organization of health care. They should also assess the economic efficiency of teaching to ascertain whether the time and efforts of the teaching staff have been optimally adapted to the needs of training and whether in the process of medical training oncology has been given the optimum amount of students' time at the minimum of expense. The survey should be carried out by the committee coordinating oncological training, which should submit its analysis and conclusions to the faculty.

Since an assessment by a professional body and the health service administration depends on the system and structure of the health service in a given country, no standard solution can be proposed. One of the ways in which it could be generally carried out is by a periodic examination of the reactions of representative groups of physicians to simulated standard situations in the field of prophylaxis, diagnosis, treatment, and prognosis. Such situations can best be presented by means of films or videotapes, and the reactions of the persons concerned may be gathered in the form of replies to properly formulated questions, e.g. multiple-choice questions. It is best to carry out such experiments in connexion with the continuing education and postgraduate training of physicians or on the occasion of meetings of medical societies.

Another method is ongoing analysis of selected elements of medical practice according to some established criteria. This method can be used irrespective of the level of health care in a country. It is particularly suitable for use by a medical faculty, professional body, or health service administration, and is of even greater value if the assessment is made jointly by all three. The proposed evaluation of the effectiveness of medical training discussed below is based on the assumption that the quality of health services resulting from the level of knowledge, abilities and types of approach of the medical personnel is unknown. Thus the assessment should start with the definition of agreed criteria for the quality of medical services in a given field for a given population.

A selected part of the medical services, for instance the services rendered by a hospital ward, is evaluated according to these criteria and the results of the evaluation are used in teaching.

The criteria for evaluating hospital work may include the following elements:

- the reliability of the diagnosis;
- the correctness of decisions to hospitalize patients;
- the justifications for diagnostic procedures;
- the justifications for therapeutic measures;
- the incidence of complications during treatment;
- days in hospital.

The assessment should concern the treatment of frequent types of cancer with regard to which sufficiently precise principles have been adopted. The recorded deficiencies in the management of cases may be classified additionally according to their source or cause, in the following way:

- individual causes;
- ward causes (organizational);
- inadequate knowledge;
- inadequate skill;
- inadequate behaviour (approach);
- inadequate equipment, etc.

It is extremely important to observe the principle that the only aim of evaluation is to obtain results that can be used to improve the teaching.

How often and by whom the evaluations are made depends on local conditions and current needs. Student examinations and evaluations of teaching by students usually take place once a year. Evaluations by professional bodies and health administrations are less frequent; they take place every few years and are usually performed jointly by one such body and the health service administration.

In university teaching and in postgraduate training, stress should be laid on the usefulness and necessity of a systematic evaluation of behaviour. The conviction should be inculcated in the course of teaching that the use of social resources should be controlled, and easily comprehensible examples should be presented of the material and moral losses suffered by medical services and science through the lack of an objective assessment of achievements.

At the same time, the method used should ensure the maximum efficiency of the evaluations. They should impose the smallest possible burden on the persons who do them and on those who are evaluated. The greatest possible integration of evaluations concerning conduct in various medical fields and specialties should be guaranteed. It is especially important that there should not be the slightest doubt among those who perform an evaluation and those who are evaluated about the necessity of the evaluation and the benefits it will bring; and the results must be open. An evaluation procedure that does not fulfil these conditions is a waste of time and of effort.

WAYS OF IMPROVING UNDERGRADUATE TRAINING IN ONCOLOGY

Programme organization

Although it might seem a basic function, there are few medical schools around the world that have attempted to set down an integrated set of objectives for cancer education. Some schools have developed their own set of objectives, frequently combining those laid down by a multidisciplinary cancer education committee with those of units of research in medical education. Some schools have gone ahead and developed teaching manuals based on these objectives.

Laying down a comprehensive set of objectives for cancer education integrating basic and clinical sciences is extremely important, and a complicated task requiring not only subject matter specialists but also education specialists knowledgeable in categorization so that all aspects of learning are included. The more detailed and specific the set of objectives, the easier it is for both students and teachers to appreciate the overall goal and the best methods of reaching it.

Most teachers in their lectures limit themselves to the mere transmission of facts, information, and concepts, which form the lowest levels of educational objectives. There is, however, a large body of evidence that the student learns the facts better and quicker by himself without the teacher. For more advanced teaching objectives, such as synthesis, analysis, problem-solving, and judgement – in other words the use of facts in the clinical setting – the involvement of the teacher becomes very important.

The design of educational experiences defined as the acquisition of skills has recently been greatly improved by the use of several aids in the category of models, phantoms, etc. The design of educational objectives in relation to attitudes is, however, far more difficult. To put the emphasis on attitude formation and interpersonal skills is not to deny the need for clinical knowledge, but

to plead for it to be put into perspective, perhaps even into a proper balance. There is little wonder that students tend to be pessimistic if their first exposure to the effects of cancer is in the autopsy room, as it is in many schools. The impressions they receive from such an experience should at the same time be counterbalanced by encounters with patients cured of cancer. An appropriate setting might be a follow-up clinic where they come into contact with the medical, supportive, and communication roles of the physician as well as the needs of the cancer patient.

Medical students must be trained not to avoid patients with cancer, especially those with advanced cancers. They must learn to accept more limited goals than cure and understand that palliation is extremely important to the patient and family. They must become familiar with the many psychological aspects of cancer and learn to deal effectively and humanely with the cancer patient and his family. They must learn that cancer is curable and that active attitudes and approaches pay real dividends. They must learn not to give up therapeutic efforts until they are absolutely certain that such efforts are no longer worthwhile. They must know about the varied responses of the patient and his family to the patient's cancer and its therapy, and learn how to deal with anger, frustration, depression, denial, withdrawal, and imminent death.

Other particular problems in cancer education have been identified. In many schools there are still departments that teach cancer but apparently have no communication with other departments. In a large percentage of schools there is little or no teaching on the broad aspects of tumour biology, epidemiology, cancer prevention, and early detection. A surprisingly large number of students have never seen patients with such common tumours as melanoma or cancers of the lung, breast, or colon; a large percentage of students have had no instruction on radiation oncology; and the psychosocial aspects of cancer are in general taught poorly or not at all. There is a need to develop better methods to ensure that, to emphasize the curability of many forms of cancer, the students see patients in long-range follow-ups. It has also been found that in many schools the cancer faculty members have little time to teach because of research, administrative, or practice commitments.

If the students are to obtain a reasonably comprehensive education in cancer during their medical school career, it is important for a multidisciplinary faculty committee to set down the objectives in great detail in all the areas noted above, as well as the best methods of meeting the objectives. The hit-or-miss approach to cancer education should no longer be acceptable.

On completion of his undergraduate course, the student should be able to achieve the following objectives in order to be fully oriented towards the needs of the community:

- to explain recent views on the etiology and pathogenesis of cancer, epidemiology, tumour biology, and pathology;

- to enumerate and describe methods of prevention, early diagnosis, health education of the public, and patient education;
- to carry out history-taking and employ clinical and laboratory methods for the detection of cancer;
- to describe the treatment available for the management of the common tumours as a primary care physician would require to know it;
- to justify the multidisciplinary approach to the solving of the diagnostic and therapeutic problems of neoplastic disease and its socioeconomic consequences;
- to estimate the psychological and emotional needs of the patient and the family and establish a good rapport with them;
- to appraise community problems and be familiar with methods of continuing care, follow-up, rehabilitation, and terminal care;
- to describe and analyse the organization of oncology services and patterns of patient referral, and to evaluate the services not based on hospitals.

The contents, teaching methods, and evaluation should be consistent and be based on these objectives. The learning outcomes should be assessed and used for evaluation, and be the subject of further study.

There is little evidence that oncology teachers have consciously set out to apply those educational principles which have been found to be effective in other settings – the setting of objectives, the encouragement of expectations, the inculcation of a sense of motivation, the devising of learning experiences that require active participation, and the provision of a feedback.

Within oncology courses there has to be a shift from factual clinical teaching to the teaching of interpersonal communication skills. Medical students who have had no chance to discuss with their teachers the difficulties of talking to patients with cancer may, when qualified, try to avoid worrying and unpleasant discussions of this sort. It is no bad thing for students to become aware that most of their teachers find it difficult to know what to tell patients about the diagnosis of cancer, and that they sometimes make wrong decisions because they do not fully understand the patients' attitudes and experiences.

Finally, whether it be in the area of clinical knowledge, skills, or attitudes, there has to be greater emphasis upon active learning as opposed to passive learning. Problem-based learning needs to be substituted for much didactic teaching.

The cancer specialty as a whole would benefit from an analysis of the problems and tasks the graduate will face in relation to oncology. Teaching at present is too oriented towards hospital instead of community medicine. The selection of cancer education programmes should depend on the

role primary care physicians have to play in the domain of oncology which, whatever their social environment is, may be described as one involving a permanent conflict between limited experience on the one hand and grave professional responsibility on the other for the efficient handling of every suspected or symptomatic cancer case.

The ideal result of undergraduate education in oncology would be an improvement in patient care, including a decrease in mortality and morbidity from cancer, demonstrably caused, at least in part, by the cancer education programme. Practical and theoretical problems make such an evaluation very difficult. Any demonstrated improvement in patient care is likely to be attributable not only to professional education but also to the availability of care and of adequate financing for care, public education, motivation to seek care, and other factors.

Rather than the long-range outcomes of education, the process of education might be evaluated, the knowledge of students and physicians being tested. This can be done on the basis of an individual department, a medical school, or nationwide. Such testing can not only identify the problems of the individual but, more importantly if properly designed and evaluated, identify failures of the educational process. This in turn should lead to improvements in the schools' educational programmes so that the students do better as a whole. Such testing should not be indiscriminate but be carefully correlated with the predetermined objectives of the schools' cancer education programmes.

Elective courses

With the tremendous demands of many departments and disciplines on students' time, it is obvious that only a central core of knowledge about cancer can be acquired by all students, i.e., the important general aspects and principles plus some more detailed knowledge of the six most common cancers. However, there will be many students who will develop a special interest in increasing their knowledge about some aspects of cancer. For such students a number of elective courses should be designed. These might consist of a period of special research working with a faculty member or in a cancer institute, a share in clinical research, or a concentrated period of caring for cancer patients under supervision.

Some schools have considered their programme of summer fellowships for medical students to be the single most worthwhile educational project with the greatest long-range value for the money and effort expended. Even if the student does not go into oncology as a career, the concentrated experience he gains in cancer under a knowledgeable supervisor affects to a significant degree his entire future career and his clinical approach to cancer patients. These fellowships are similar to electives but are usually pursued during the summer vacation, frequently with some sort of stipend and often in specialized cancer units away from his own medical school. Cancer institutes can often be

persuaded to draw up a special programme for a few medical students from one or more different schools. So as to define the goals of the programme and make certain that the students acquire valuable experience, it is recommended that a joint committee of the medical school and the cancer institute staff should be appointed to prepare the students beforehand for the summer fellowship, usually through a series of special lectures, to outline the fellowship programme in some detail, to evaluate its accomplishments, and to make recommendations for any changes needed. As compared with postgraduate fellowships, these student fellowships cost a great deal less money and affect larger numbers of students at an early and critical phase of their careers.

The available teaching texts and other educational materials should be reviewed regularly and it should be made certain that students have ready access to them. If the teaching materials are inadequate, better ones should be designed.

By far the most important learning comes from reading, especially when that reading concerns a particular problem currently faced by a student. Such problem-oriented learning is used and retained to a much greater extent than indiscriminate reading unrelated to specific current problems. An adequate library of cancer books and of journals organized and arranged so that they are easily available at all times is therefore essential.

A wide variety of other teaching materials is now available in many parts of the world – including films and film-strips, slide-tape units, patient simulation materials, self-assessment texts, computer-assisted instruction, and cassette literature reviews.

The undergraduate's point of view

The student's point of view on cancer education is of importance because it reflects his attitude to the teaching process and indicates how he accepts the teaching and how the educational process should be adapted to become more efficient; and it identifies the oncological problems of special interest to him. The following discussion, which is based, however, on the opinion of the student population of one medical school only, may be considered as a useful model for future studies on the problem.

It appears that the viewpoints of the students reflect their career preference, as some 60% of them proposed to go into general practice. They wanted to know the role of the family doctor and the problems of the patients in the community. They wished to view the cancer patient as a whole, not only in terms of the presenting features of the disease, how to develop a high index of suspicion, and the importance of early diagnosis and prevention but also in terms of which cancers are treatable and by which modalities, why others are not, and what the problems of communication are with the patient and the family.

In relation to the preclinical years, the students felt that the relationships between the subjects taught and clinical oncological problems are not sufficiently stressed; they would welcome closer integration of preclinical and clinical subjects. Laboratories were considered to be very important as they give the students the opportunity of more informal contact with colleagues and the teaching staff.

In relation to the clinical years, they felt that most of the oncology should be integrated within the specialties. Students enjoy seeing patients and being able to meet them alone and discuss with them their problems, both medical and psychological. Students therefore should be considered as a part of the caring team, and perhaps also have a major role in the management of cancer patients.

Epidemiology and prevention were considered to be of importance, but the students wished to see them taught more within the framework of their clinical experience.

The students felt that lecturing, although an important method of communication, gives too little scope for discussion. They preferred to use smaller problem-oriented texts than learn from large textbooks. Methods of self-instruction, in particular video tapes, were considered to be valuable learning aids.

Finally, the design of course objectives, in the students' view, should take into account career choice, patterns of malignant diseases, patterns of medical practice, and continuing education.

Use of cancer institutes and the role of voluntary and professional leagues and societies

In some areas the relationship between cancer institutes and medical schools is poor, so that the special knowledge and attitudes of oncologists in the cancer institute and the large numbers of interesting cancer patients are not used for the education of medical students. The cancer education committee of the medical school should work with the cancer institutes to change this situation. If possible, the director of the cancer institute should be a member of the committee.

The cancer institutes may be especially effective in improving the efficiency of instruction in clinical practice by offering their facilities for practical training. The institutes' experience may assist the medical faculty and the cancer education committee in defining the aims and goals of teaching in oncology, in shaping examination requirements, and in planning and writing oncological texts for the students' use. Members of cancer institutes should participate in instruction given to students at medical schools and, vice versa, members of medical faculties may instruct students exploiting the clinical facilities of the institutes.

It should, however, be kept in mind that the aim of medical education is to equip graduates with the knowledge and skills needed at the community

level to treat cancer patients, among others. The training of such doctors is entirely the responsibility of the medical school, and the school has to select the most effective ways and means of achieving that goal. The school therefore has itself to decide which one of the oncological organizations available is most suitable, or what type of organization should be created for the purpose, where it should be localized, and in what way it should be exploited for training. In any case it is for the school to control the entire course of cancer teaching to students, from the earliest planning through implementation and evaluation up to continuous modifications required to effect improvements. This is so for all possible structures of cancer education, whether by interdepartmental education, oncological units, departments of oncology, interdisciplinary centres, or independent cancer institutes not physically connected with and not affiliated to the university.

The traditional role of cancer leagues and associations was fund-raising and health education. However, there is a recent trend towards developing new activities in those organizations, such as: the funding of scholarships for young scientists; support for the preparation and/or translation of oncological texts and manuals and their free distribution among undergraduates; participation in the teaching of students, training of doctors, and development of primary and secondary preventive measures in oncology; and stress on preventive measures in health education.

The role of WHO

The teaching of oncology should be considered as an integral part of medical education. The aspects of this education of special interest to WHO are prevention and primary health care.

In the prevention of cancer, it is of the utmost importance to foster awareness of the extra-medical factors that are established or potential causes of increased cancer risk. Those factors, of environmental character in the broadest meaning of the term, influence the health of the whole population. WHO advocates an approach to cancer that is oriented to the health of the population as a whole, an approach that should be adopted in medical education, both at undergraduate and at postgraduate level. Within that education there should be emphasis on the present-day trend in modern industrialized societies towards prolongation of the life of the population, a result of which is the increased role played by chronic degenerative processes in the health of the population, among them malignant diseases.

RECOMMENDATIONS

1. The aim of undergraduate education in cancer should be to produce graduates with sufficient practical knowledge of tumour biology and pathology, epidemiology, prevention, early diagnosis, methods of treatment, and follow-up and rehabilitation to prepare them for future medical practice, especially at the primary health care level. The aim should not be to produce specialists in oncology.

2. All medical schools should review their educational objectives on the basis of task analysis of physicians practising at the level of primary health care and of scientific developments in relation to knowledge, skills, and attitudes.

3. Cancer institutes and universities should cooperate in the cancer education of undergraduates; this applies particularly to the cancer institutes where patients are managed. Two main policies should be considered: direct training of the students within the institutes, and participation of staff members of the institute in education in the medical schools.

4. A specifically designated part of the curriculum should be devoted to oncology, but may be of variable length. Undergraduate teaching in cancer should be reviewed regularly by a designated group or an individual (e.g., a professor); and there should be close integration of all the staff involved in teaching, with coordination of the teaching.

5. Integration of the objectives into the current educational programme should depend on the medical school, its curriculum, the type of oncological services, and the patterns of disease.

6. Coordinated teaching in cancer should be given during the final years of the curriculum with the purpose of providing senior students with a minimum standard of oncological knowledge.

7. International organizations have a role in the coordination and facilitation of information exchange on course objectives and methods of evaluation. They should examine the range of strategies available for getting teaching innovations adopted by medical schools with the aim of producing a list of examples from which schools can select those relevant to their own situation. They should stress the importance of integrated oncological teaching in medical schools at undergraduate level, with special emphasis on the needs of the community in the field of primary health care.

8. Deans of medical schools and faculties and persons who have the responsibility of university programmes should be actively encouraged to accept the idea of coordinating the oncological information the students receive, which is at present scattered over different disciplines throughout the course of their university curriculum.

Annex

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